Center Innovation Fund: ARC CIF

BiocapsuleTechnology for Delivery of Protein Therapeutics in Space

Completed Technology Project (2012 - 2013)

Project Introduction

This project concerns NASA Biocapsule technology, which involves the develoment of buckypaper containers for living cells, to be used for delivery of medical therapeutics. Effort was focused on study of buckypaper durability, a critical feature for this application. The project was designed to pave the way for Biocapsule animal studies, which are expected to be the next major thrust of the project and advances the technolgy frm a TRL 3 to a TRL 4.

The study provides important validation of the use of carbon nanotube buckypaper as a material for use in implantable medical systems for containing living cells. The field of cell implantation requires that the material used to make the container for holding cells withstand chronic exposure to water, under mild shear conditions.

The project involved two phases of work. Fabrication of carbon nanotube buckypaper, and exposure of the buckypaper to aqueous media, with subsequent gravimetric analysis and electron micrscopy as endpoint. This work constitutes the first ever study of carbon nanotube buckypaper durability under conditions relevant for medical aplications. The study demonstrates that buckypaper is highly durable in aqueous media and is not subject to the development of defects that would constitute a problem for long-term applications in biolgoical systems in which the integrity of the material is key.

Anticipated Benefits

This technology would improve delivery of medical therapeutics to astronauts on long-duration space missions.

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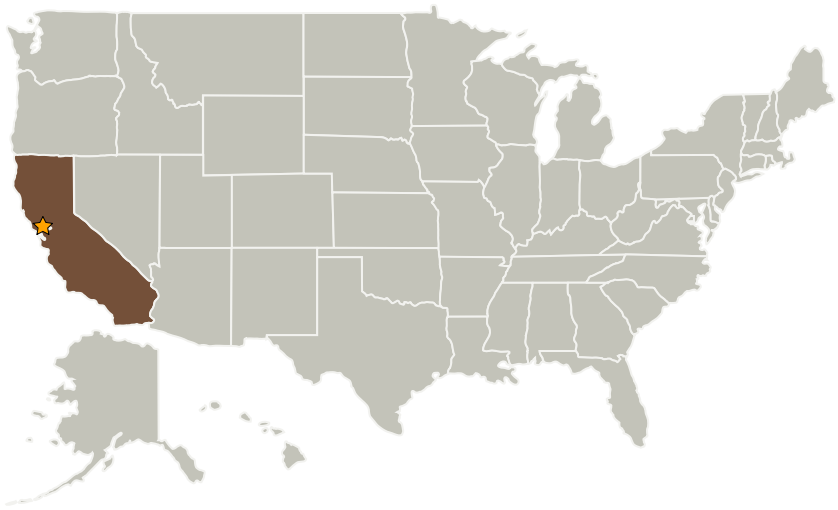
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Stories

1676 Approval #17536
(https://techport.nasa.gov/file/8765)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Center Innovation Fund: ARC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

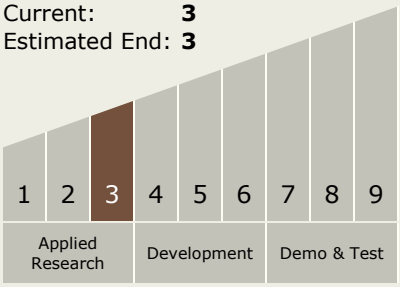
Harry Partridge

Principal Investigator:

David J Loftus

Technology Maturity (TRL)

Start: **3**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.1 Architecture Design and Analysis